

view of Yamanashi, and further in view of U.S. Patent No. 6,638,652 to Motozono. These rejections are respectfully traversed.

Claim 1 recites, among other features, a cathode-side gas pressure detecting unit configured to detect a cathode-side gas pressure within at least one of the oxidizing gas supply line and the cathode; a target hydrogen partial pressure determining unit configured to dynamically calculate a target hydrogen partial pressure regarding a hydrogen pressure among a gas mixture in the anode, the dynamic calculation being based on the detected cathode-side gas pressure and a required electricity generation amount; a hydrogen supply pressure calculating unit configured to calculate a hydrogen supply pressure of hydrogen to be supplied to the fuel cell based on the calculated target hydrogen partial pressure and the detected cathode-side gas pressure; and a hydrogen supply control unit configured to regulate the supply of hydrogen from the hydrogen supplying unit to the fuel cell at the calculated hydrogen supply pressure. Claim 6 recites similar features.

In rejecting Applicant's claims, the Office Action relies on Iio as allegedly teaching many of the detailed features recited in the pending claims. The application of Iio to the subject matter of the pending claims is misplaced. Iio teaches hydrogen permeating to a post-separation side of a hydrogen membrane being supplied to an anode chamber. *See Abstract.* In Iio, hydrogen supply is provided by a steam reformer 4 that generates a reformate gas containing hydrogen from a liquid fuel such as alcohol or gasoline. *See paragraph [0018].* In Iio, a hydrogen sensor 40, a pressure sensor 44 and a pressure sensor 45 (*see, e.g., Fig. 1*) are provided as inputs to the controller 10 to provide that controller with the information required to control intake air valve 30 and exhaust/discharge valve 60. *See paragraph [0040], and paragraphs [0032] - [0039].* The control methodology for the controller of Iio is shown, for example, in Fig. 5, and described at paragraphs [0078] and below. This is described

specifically as "[a] control routine for the hydrogen partial pressure on the post-separation side 11B of the membrane hydrogen separator 11 which is executed by the controller 10."

Briefly, the control routine of Iio detects a load requirement, calculates a target hydrogen partial pressure based on that load requirement and then it is the hydrogen partial pressure on the post-separation side 11B of the membrane that is controlled specifically by "introducing air into the anode effluent recirculation passageway 8 from the intake valve 30" or by "[a] part of the gas in the anode effluent recirculation passage 8 [being] discharged from the discharge valve 60." The control methodology in Iio is very specific in this regard in that it maintains an actual hydrogen partial pressure on the post-separation side 11B of the membrane hydrogen separator 11 by operating these valves.

Iio imperfectly describes this process where it discusses an "optimal hydrogen pressure" at, for example, paragraph [0083]. All of the control methodology conducted in Iio has to do with determining a target hydrogen partial pressure, and maintaining some sense by which to adjust the actual hydrogen partial pressure to achieve the target. In fact, the next step in the process shown in Fig. 5 detects an actual hydrogen partial pressure P2h on the post-separation side 11B of the membrane hydrogen separator 11. Then, in step S14, a determination is made whether or not the actual hydrogen partial pressure is equal to the target value of hydrogen partial pressure. What occurs in the Iio system in differing circumstances in this regard is described at paragraphs [0094] - [0106] of Iio. There is no manner by which Iio calculates a hydrogen supply pressure of hydrogen to be supplied to the fuel cell based on the calculated target hydrogen partial pressure. Rather, Iio modifies the actual hydrogen partial pressure to be supplied to the fuel cell when the actual hydrogen partial pressure is not equal to the target hydrogen partial pressure. Iio is in no way concerned with calculating a hydrogen supply pressure to be supplied to the fuel cell based on the calculated target hydrogen partial pressure and the detected cathode-side gas pressure.

Further, despite the assertion to the contrary in the Office Action, the control unit 10 in Iio is not configured to regulate the supply of hydrogen *from the hydrogen supplying unit* to the fuel cell at the calculated hydrogen supply pressure. Rather, the control unit 10 in Iio, as discussed above, is configured to regulate the hydrogen partial pressure on the post-separation side 11B of the membrane hydrogen separator 11 to coincide with a determined target hydrogen partial pressure based on manipulating Valves on that side of the membrane airborne hydrogen separator 11 in the Iio device.

Applicant's representative presented the above arguments to Examiner Lee during the March 15 interview. The Examiner indicated that she would have to further consider Applicant's arguments, while reviewing the claim language and the Iio reference in more detail, prior to determining whether these arguments distinguish the subject matter of the pending claims over the Iio reference.

The Office Action concedes that Iio fails to teach a cathode-side gas pressure detecting unit configured to detect a cathode-side gas pressure, and all the other features regarding a cathode-side gas pressure recited in the pending claims. The Office Action, rather, relies on Yamanashi as allegedly disclosing the features that Iio fails to teach in this regard. The analysis of the Office Action fails for at least the following reasons.

Yamanashi is directed to purging water that may accumulate in the vicinity of electrolytic membranes according to an improved methodology. In Yamanashi, pressures on the anode side and the cathode side of a fuel stack are consistently monitored and adjusted such that "the pressure difference between the anode side and the cathode side do not exceed respective allowable limits to prevent an electrolytic membrane from being ruptured." *See* Yamanashi at col. 4, lines 30-35, cited by the Office Action. The Office Action concludes that Yamanashi, in this teaching, discloses that it would have been obvious to one of skill in the art at the time the invention was made to dynamically control and calculate the anode

supply of Iio based on the cathode air pressure for the benefit of not exceeding the amount of air required by the fuel cell. To the extent that this is even a reasonable conclusion, which Applicant does not believe that it is, this does not allow Yamanashi to make up for the shortfalls in the application in Iio to the subject matter of the pending claims, and does not make up for the conceded shortfalls in the application of Iio enumerated in the Office Action. It is unclear how the Office Action asserts that simply maintaining pressures on both sides of a membrane in Yamanashi at a level so as to not rupture the membrane can reasonably be considered to be made to augment the target hydrogen partial pressure determination of Iio based on a required electricity amount. It is also unclear how any cathode-side gas pressure detection disclosed in Yamanashi could be forced into a target hydrogen partial pressure calculation based on a load as disclosed as Iio. Further, it is unclear how the Iio device would then be, in a modified manner, made capable of adjusting its actual hydrogen partial pressure based on such a detected cathode-side gas pressure. The methodology described in Iio is specific and complex. It relies, however, on distinct inputs that make no room for adjustment by inclusion of another input such as measurement of a cathode-side pressure, which is disclosed by Yamanashi.

In this regard, it is not a simple matter as the Office Action suggests to simply find in the prior art allegedly most of the building blocks in the claims with an attempt to render obvious the subject matter of those claims. The U.S. Supreme Court, in its decision in *KSR v. Teleflex, Inc.*, 550 U.S. 398, specifically stated "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art ... it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity would be

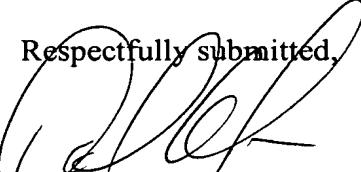
combinations of what, in some sense, is already known." Citation omitted. The obviousness rejection in the pending Office Action does not even get this far, however, in that it is clear from the above discussion that neither of the references teaches, or otherwise would have rendered obvious, the combinations of all the features positively recited in the pending independent claims.

For at least the foregoing reasons, claims 1 and 6 are patentable over the currently-applied combination of Iio and Yamanashi. Further, and because Motozono does not make up for any of the above-identified shortfalls in the application of Iio and Yamanashi to the subject matter of the independent claims, claims 3, 5, 8 and 10 are also not rendered obvious by any of the currently-applied combinations of references for at least the respective dependence of these claims on allowable base claims, as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejections of claims 1, 3, 5, 6, 8 and 10 under 35 U.S.C. §103(a) as being unpatentable over any combination of the currently-applied references are respectfully requested.

In view of the foregoing, Applicant respectfully submits that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 3, 5, 6, 8 and 10 are respectfully requested.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Daniel A. Tanner, III
Registration No. 54,734

JAO:DAT/cfr

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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